Observations of Agile/Earned Value Management (EVM) and Beyond

February 19, 2015

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Office of the Secretary of Defense
USD(AT&L) – DASD(C3 & Cyber)

My Perspective on EVM & Agile

- **As a Government Program Manager**
  - ***Aircraft Avionics Systems***
    - ***Major EVM thrust (field capability on C-17)***
  - ***Simulation Network of Satellites & Constellation***
    - ***Major software design***

- **As a Industry Client Executive**
  - **For the National Intelligence Account**
    - **Led teams at NSA, NRO, DNI, etc.,**
    - **All teams used Agile to deliver capability**

- **As a Member of Defense Science Board on IT Acquisition in DoD**
  - **Crafted 3 chapters in final report**
  - **Contributor to National Academy Study on DoD IT acquisition**

- **As a Member of Office of the Secretary of Defense - USD(AT&L)**
  - **Acquisitions oversight of Intelligence Community, IT acquisitions, ERPs,**

"*Perspectives*"

Why I believe Agile and EVM are very important for DoD's future:

- ***Agile is needed to promote efficient and rapid IT delivery***
  - *Deliver timely, relevant solutions thru iterative and incremental delivery*
- ***EVM is needed to drive efficiency***
  - *Demonstrates efficiency and provides input to needed course corrections*
- ***Agile is needed given unprecedented Cyber threat and its impacts***
  - *Require continuous changes and upgrades across the lifecycle*
- ***EVM is needed to drive consistent-objective results***
  - *Layers of incentives tend to drive overly optimistic promises results*
- ***Agile is a mainstream process used across commercial industry***
  - *Highly collaborative with consistent results*

EVM is needed to overcome key barriers to modernize DoD's IT acquisition environment and to institutionalize Agile delivery

IT Legislative Landscape

Institutional Barrier or "Encouragement" to Drive Change?

-2010 Section 933: New Cyber process & tools

-2010 Section 804: New IT acquisition process

-2009 WARSA: ICE for certain MAIS when AT&L is MDA

-2009 Section 841: Replace IOC with FDD

-2009 Section 817: MAIS and MDAP mutually exclusive

-2008 Section 812: Pre-MAIS reporting, funds first obligated

-2008 10 USC 2222: Obligation of funds restrictions annual IRB

-2007 Section 816: Codify MAIS, SAR-like and NM-like reporting

-2007 Section 811: Time certain development for MAIS

-2006 Section 806: Notify Congress of MAIS cancelation or significant change

-1996 Clinger Cohen Act: DoD given acquisition authority to independently procure IT

- 1988 Warner Amendment: DoD to procure IT provided it was an integral part of a weapon

- 1965 Brooks Act: Provided GSA exclusive IT acquisition authority across the Government

2010 National Defense Authorization Act

IMPLEMENTATION OF NEW ACQUISITION PROCESS FOR INFORMATION TECHNOLOGY SYSTEMS

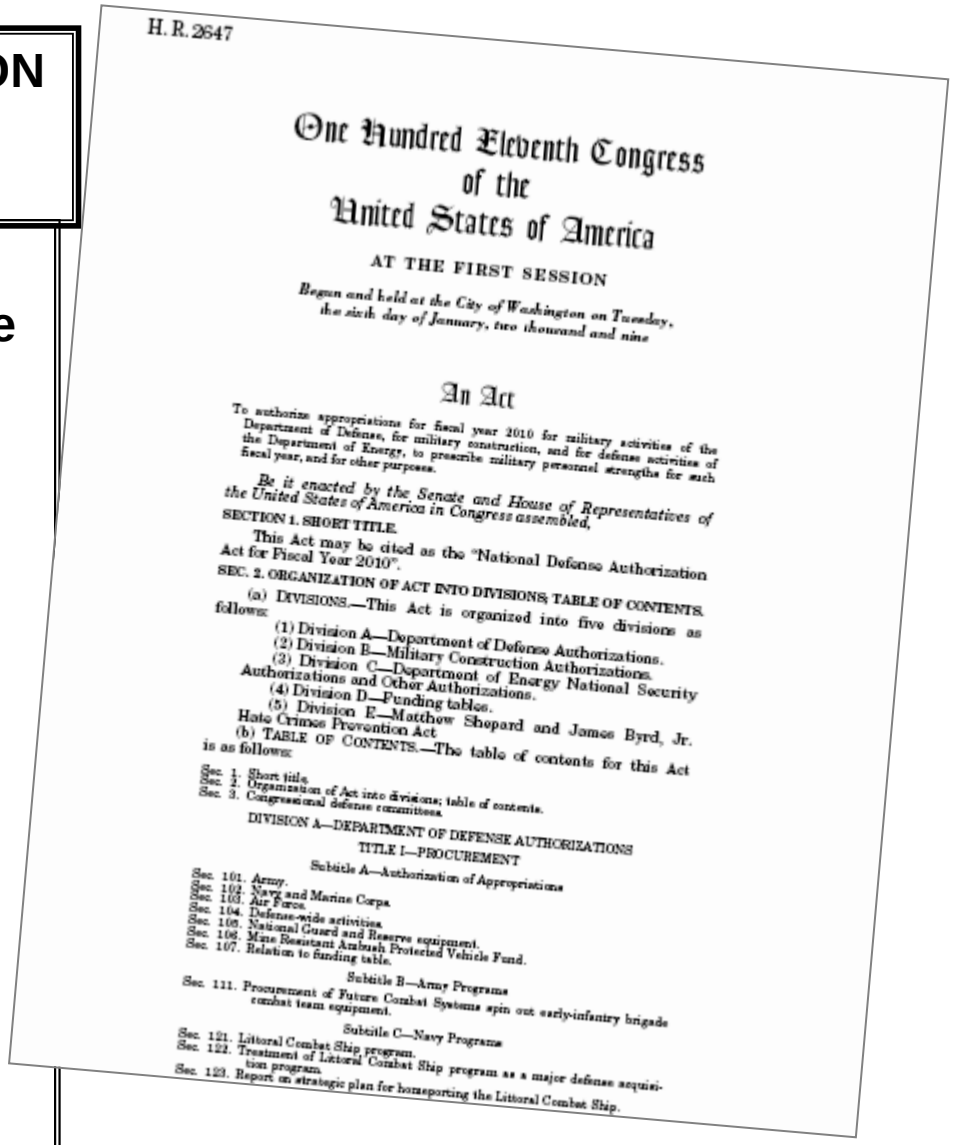
- **NEW ACQUISITION PROCESS REQUIRED —The Secretary of Defense shall develop and implement a new acquisition process for information technology systems**
  - **"… Be based on the recommendations in Chapter 6 of the March 2009 report of the DSB Task Force on DoD and Procedures for the Acquisition of Information Technology**
  - **Ne designed to include—**

    (A) early and continual involvement of the user;

    (B) multiple, rapidly executed increments or releases of capability;

    (C) early, successive prototyping to support an evolutionary approach;

    (D) a modular, open-systems approach



H. R. 2647

One Hundred Eleventh Congress
of the
United States of America

AT THE FIRST SESSION

Begun and held at the City of Washington on Tuesday, the sixth day of January, two thousand and nine

An Act

To authorize appropriations for fiscal year 2010 for military activities of the Department of Defense, for military construction, and for defense activities of the Department of Energy, to prescribe military personnel strengths for such fiscal year, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "National Defense Authorization Act for Fiscal Year 2010".

SEC. 2. ORGANIZATION OF ACT INTO DIVISIONS; TABLE OF CONTENTS.

(a) DIVISIONS.—This Act is organized into five divisions as follows:

(1) Division A—Department of Defense Authorizations.
(2) Division B—Military Construction Authorizations.
(3) Division C—Department of Energy National Security Authorizations and Other Authorizations.
(4) Division D—Funding tables.
(5) Division E—Matthew Shepard and James Byrd, Jr. Hate Crimes Prevention Act.

(b) TABLE OF CONTENTS.—The table of contents for this Act is as follows:

Sec. 1. Short title.
Sec. 2. Organization of Act into divisions; table of contents.
Sec. 3. Congressional defense committees.

DIVISION A—DEPARTMENT OF DEFENSE AUTHORIZATIONS

TITLE I—PROCUREMENT

Subtitle A—Authorization of Appropriations

Sec. 101. Army.
Sec. 102. Navy and Marine Corps.
Sec. 103. Air Force.
Sec. 104. Defense-wide activities.
Sec. 105. National Guard and Reserve equipment.
Sec. 106. Mine Resistant Ambush Protected Vehicle Fund.
Sec. 107. Relation to funding table.

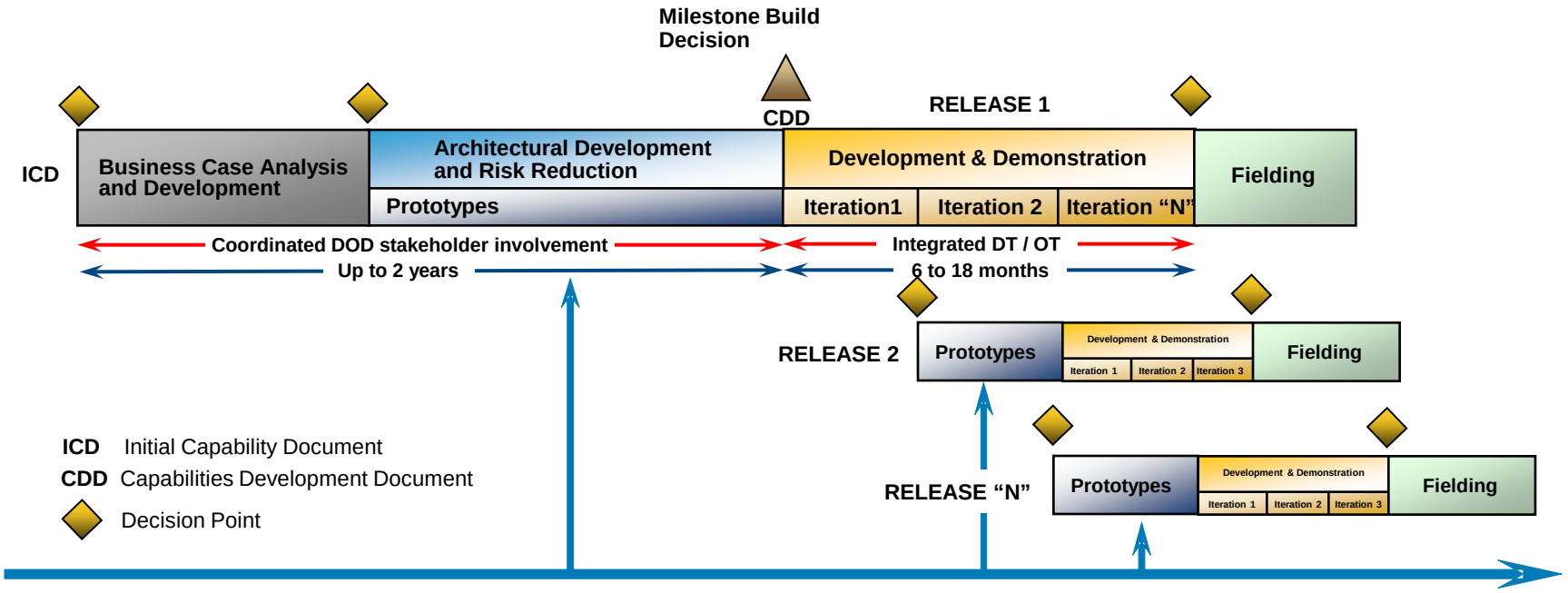
Subtitle B—Army Programs

Sec. 111. Procurement of Future Combat Systems spin out early-infantry brigade combat team equipment.

Subtitle C—Navy Programs

Sec. 121. Littoral Combat Ship program.
Sec. 122. Treatment of Littoral Combat Ship program as a major defense acquisition program.
Sec. 123. Report on strategic plan for homeporting the Littoral Combat Ship.

Acquisition Model
Chapter 6 of March 2009 DSB Report



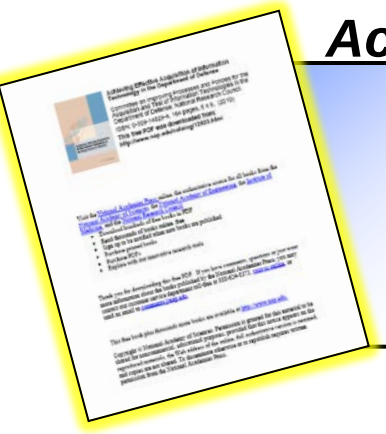
Acquisition Model: Continuous Technology/Requirements Development & Maturation

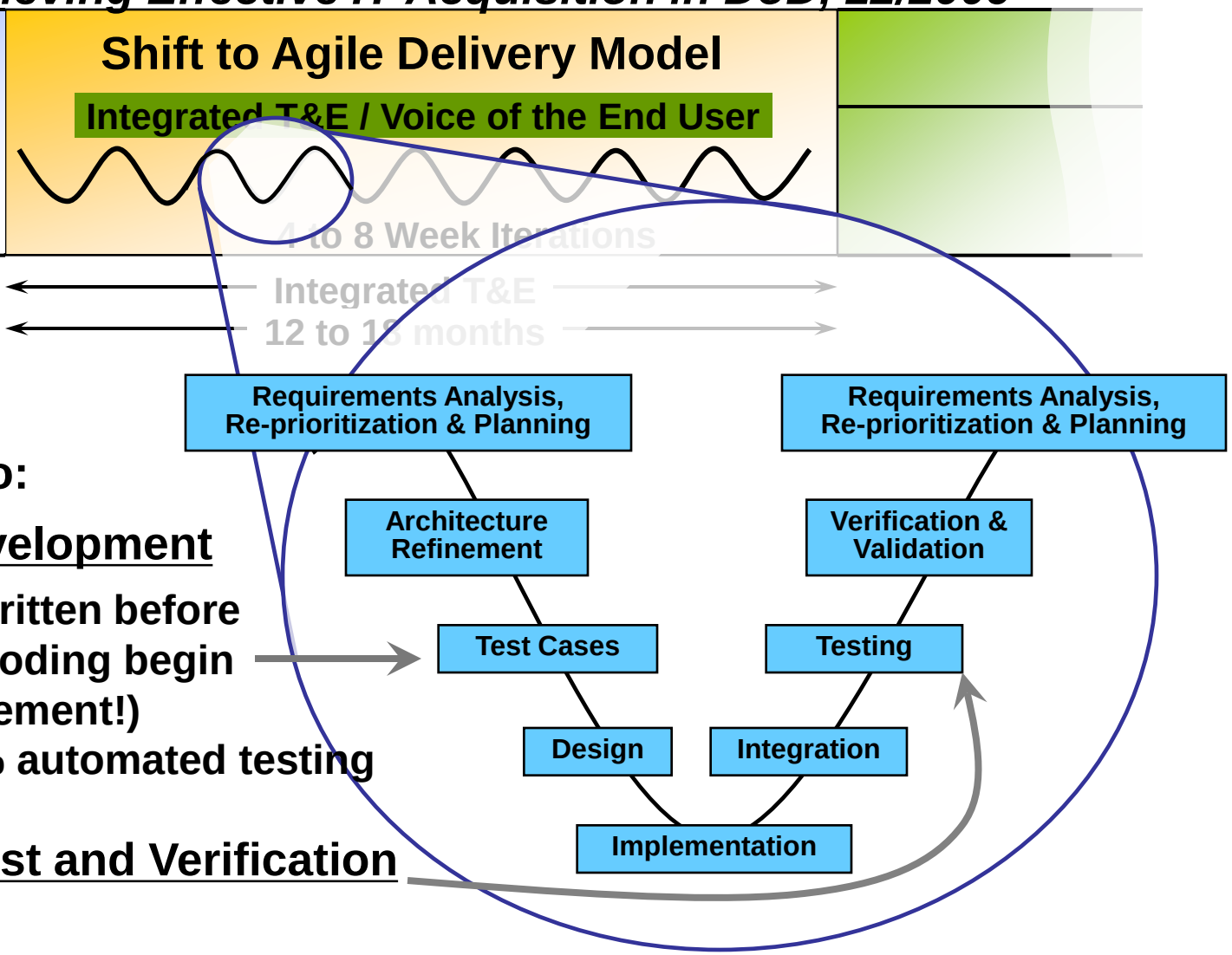
- Impact to Core DoD Processes
  - Requirements: *From*: fix set of requirements; *To*: evolving requirements & user role throughout
  - Delivery: *From: static waterfall model*; *To*: Agile model with user feedback driving priorities
  - Governance: From: Driven by Milestones & breaches ; *To*: More frequent review- delivery focused
  - Functional Areas: *From*: rigor tied to documentation for single milestone;
    To: rigor tied to demonstrated risk and delivery of capabilities

Achieving the Vision
National Academies

Advisors to the Nation on Technology, Science and Medicine

Achieving Effective IT Acquisition in DoD, 12/2009





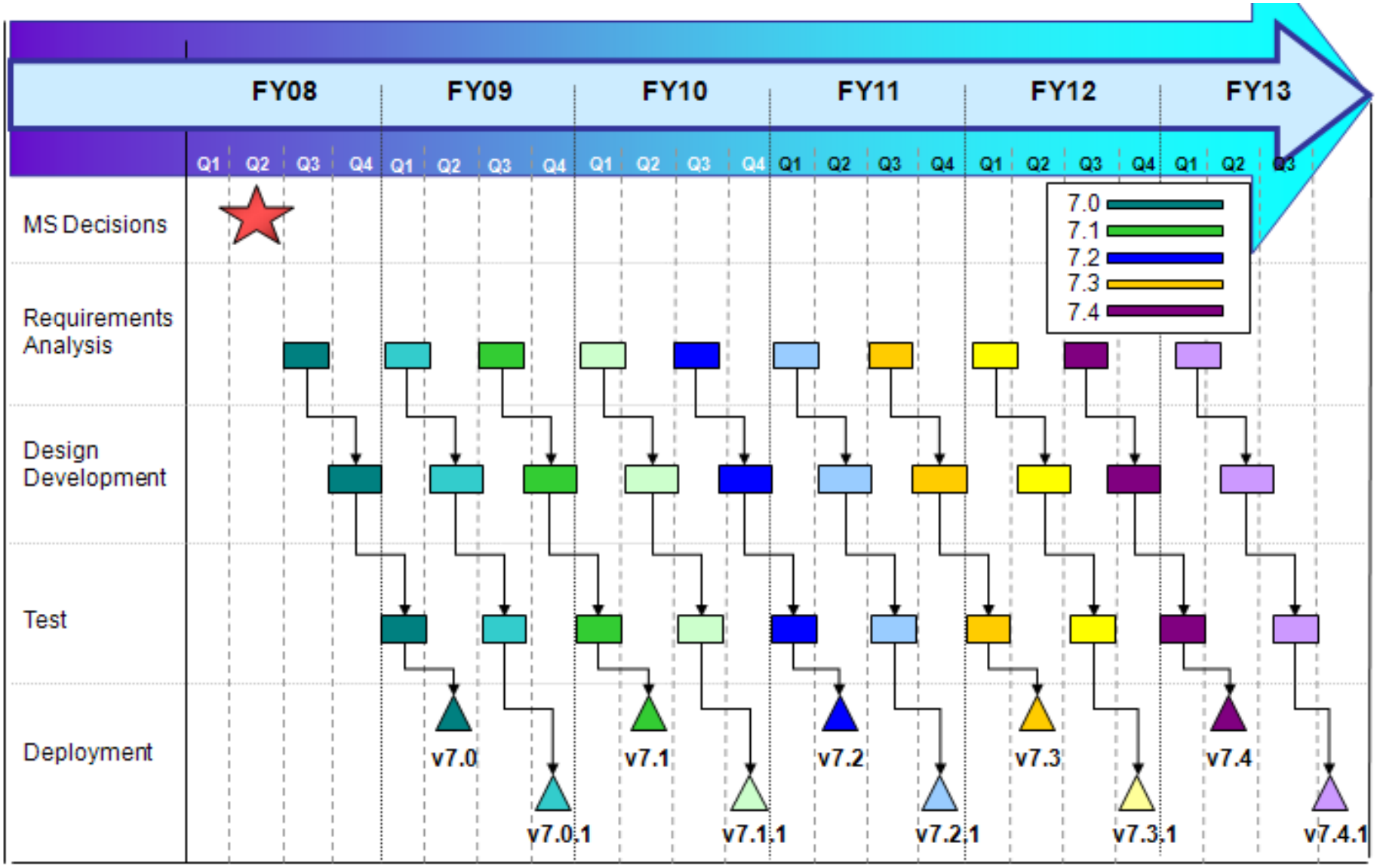
But Also:

<u>Test Driven Development</u>

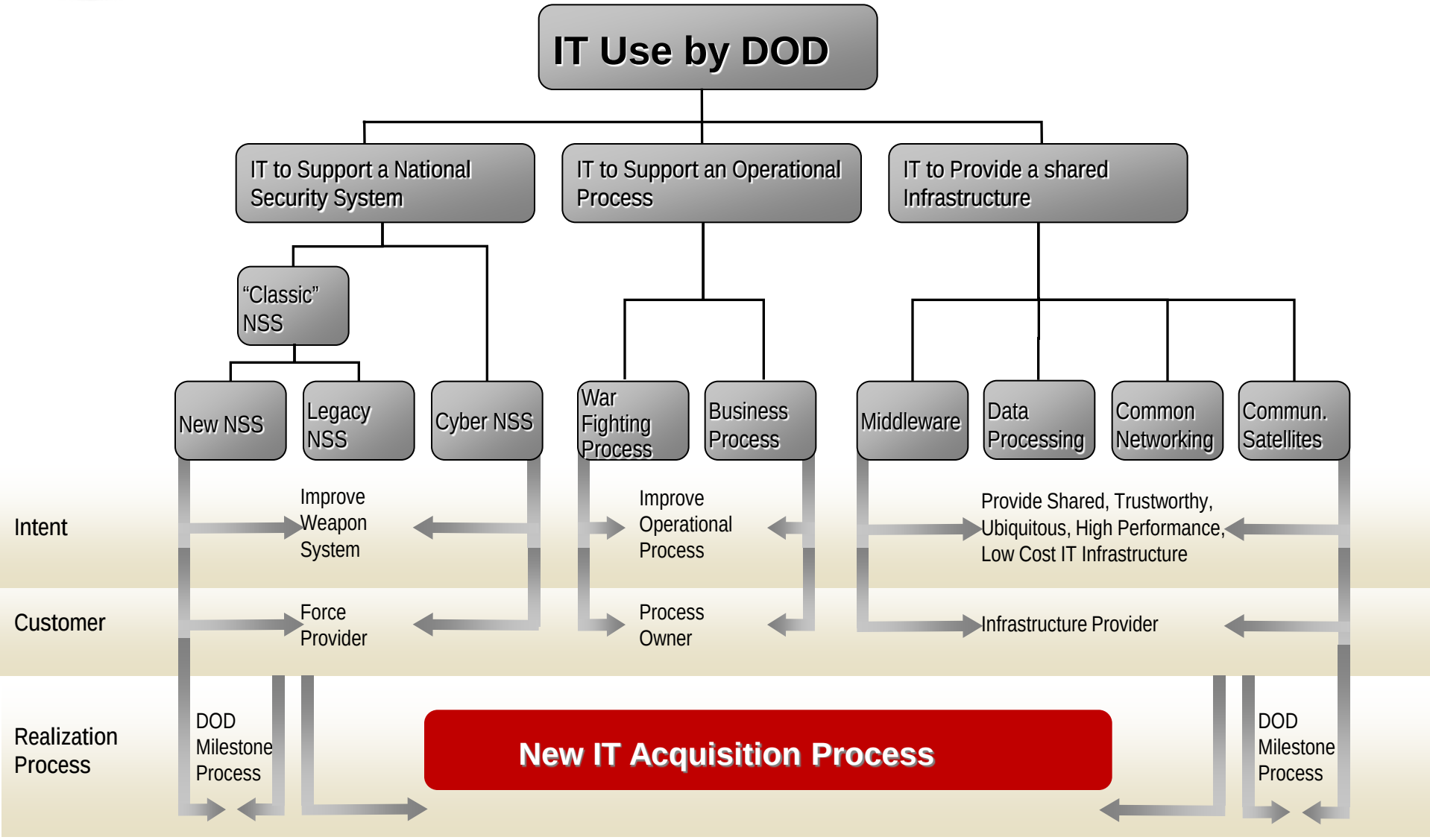
- **Test cases written before design and coding begin (Early Involvement!)**
- **Shift to 100% automated testing**

<u>Independent Test and Verification</u>

Objective: Cadence of Iterative Deliveries

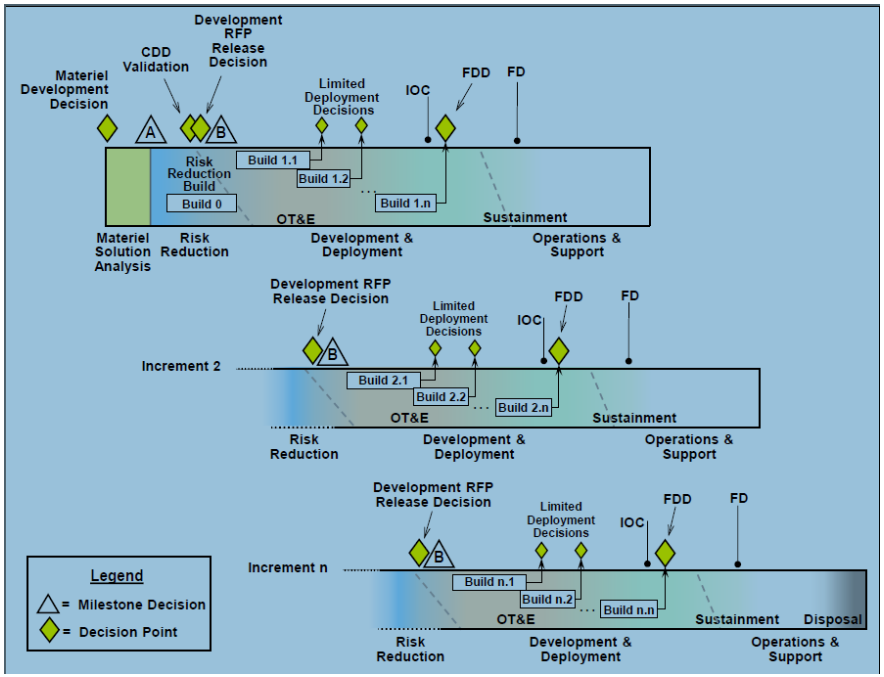


DSB Task Force Recommended Scope



DoD Landscape

DoD 5000.02 Mainstreams the Possibility Not Institutionalization



institutionalize *verb* (CUSTOM) (UK USUALLY **institutionalise**) UK US /ɪnt.stɪ'tjuː.ʃᵊn.ə.laɪz/ US /-'tuː-/ [T]

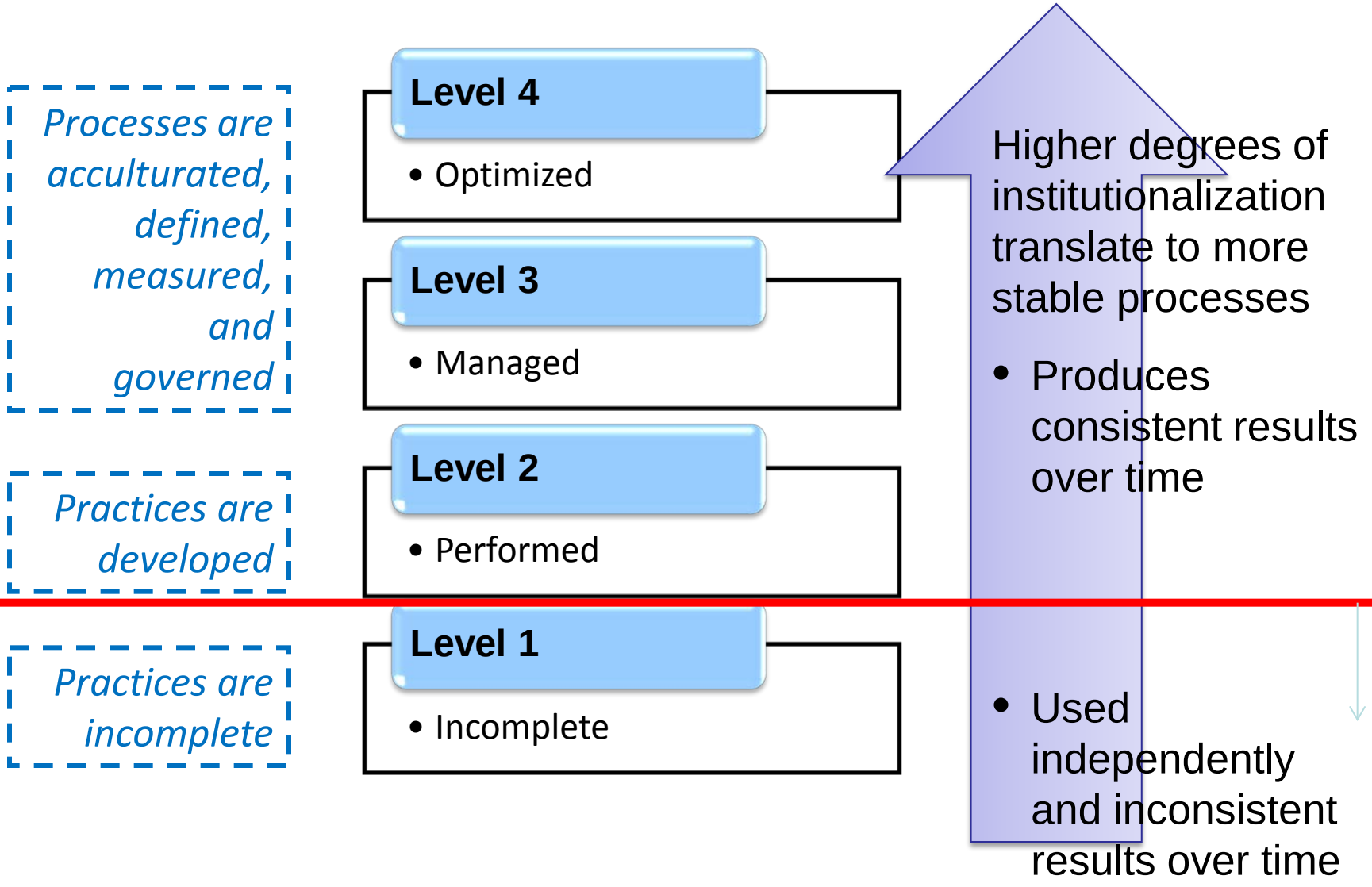
to make something become part of a particular society, system, or organization

What was once an informal event has now become institutionalized.

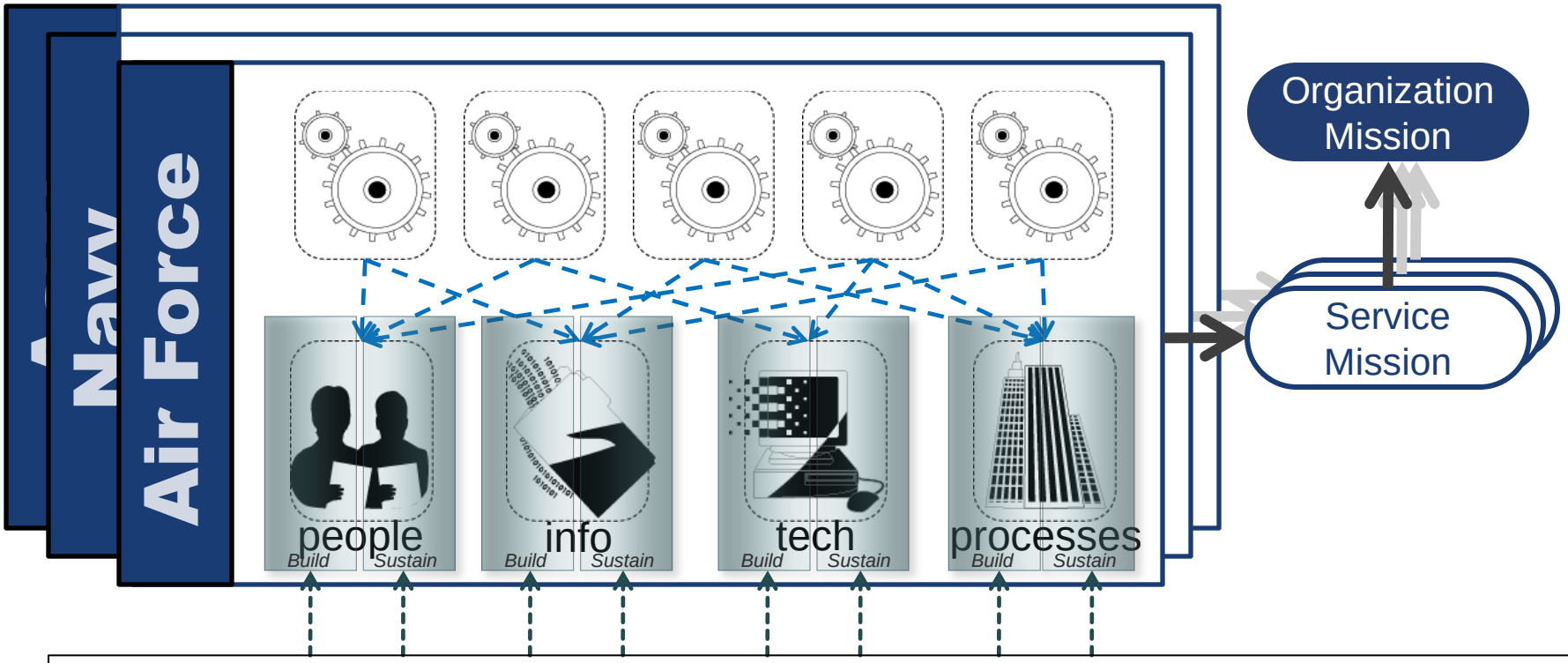
What does institutionalization look like for Agile?

- It describes when something has become ingrained in the way an organization operates

A Perspective of DoD's Agile Maturity



Key Elements in Institutionalizing Agile Processes Through EVM



Establishing Governance (P-I-T-P):

- **People** – the human capital of the organization
- **Information** – **EVM and program data**
- **Technology** – Tools, systems, network
- **Processes**–building or sustaining new capability

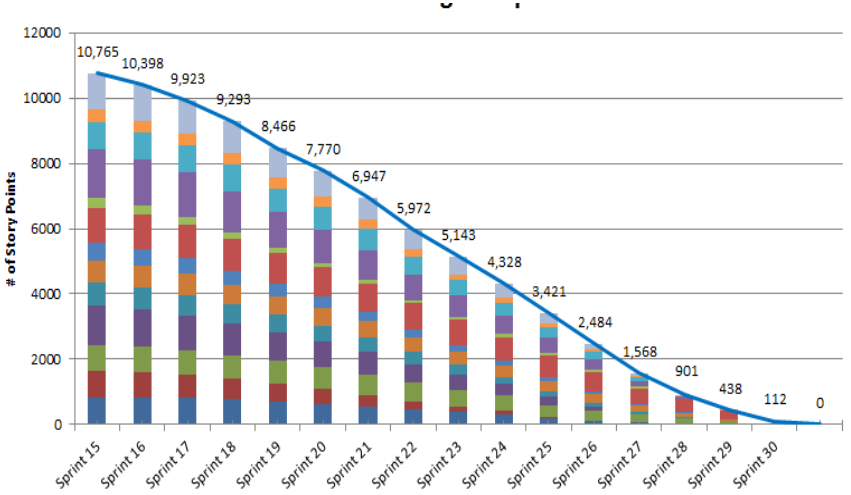
Establishing the Agile Governance Process

May 24, 2012 Acquisition Decision Memorandum for an ACAT IAM (Major IT Agile Program) That is Delivering Capability to all Services

- **Implement Quarterly Program Reviews (QPRs).**
- **Establish a Functional Manager (lead user representative) and document roles, responsibilities and processes in affected charters.**
- **Functional Manager shall present at every QPR on functional community issues, adoption, capability prioritization, etc.**
- **Implement a robust metrics collection process with metrics driven off ramps if capability is unable to deliver capability as originally promised.**
- **Develop a "Capability Roadmap" that documents the limited deployments decisions as well as the time-phased set of capabilities envisioned across the X program lifecycle.**
- **Develop "Expectation Management Agreements" that aligns the different Service components, their priorities, critical dependencies and funding expectations.**

Monthly Metrics Collection Process

	10/14 to 11/8			11/11 to 12/6		
Spin 2 Estimates	**Sprint 15 Capacity (hours)**	**Sprint 15 Plan (points)**	**Sprint 15 Actual (points)**	**Sprint 16 Capacity (hours)**	**Sprint 16 Plan (points)**	**Sprint 16 Actual (points)**
1125	880	30	22	793	83	83
370	182	5	1	150	19	14
823						
1511	1045	144	103	874	81	32
303	442	39	42	387	44	44
1080	249	41	23	234	21	23
541	600	33	8	480	53	45
679	300	50	25	456	64	18
669	250	37	3	630	52	37
1218	1045	82	90	883	81	69
803	239	31	2	223	43	33
809	368	40	37	368	59	59
834	882	105	11	875	144	18
10765	6482	637	367	6353	744	475



Single (One) Integrated Financial & Metrics System Across The Industry Prime and All Subcontractors is Important

PM Presented EVM Data at a QPR

Performance

Work Scheduled = 40.46%
Work Completed = 41.89%
Cost Expended = 41.63%

Cum CPI = 1.006
Cum SPI = 1.035
Cum CV = $0.505M
Cum SV = $2.843M

Forecast

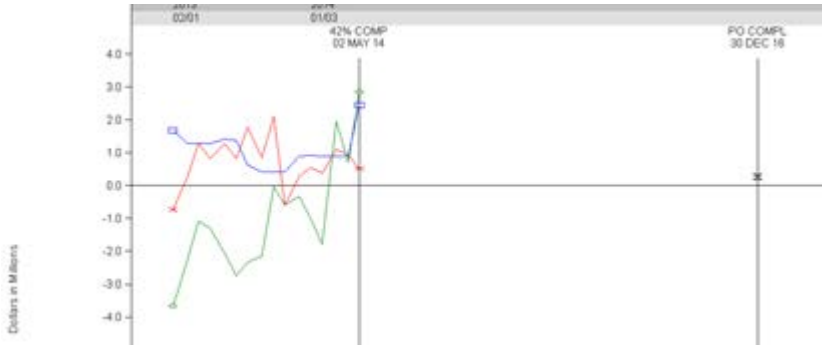
	Cost at Completion	Price at Completion
KTR	$199.59	$221.36
CCE	$199.59	$221.36
PMO	$199.59	$221.36

Cost & Schedule Drivers

WBS #	Description	CV	CV$Cum	CV%Cum	VAC
1.5.3	System Testing	↔	-2,673.9	-150.34	-2,722.0
1.2	Spiral 2 Logistics - Spin 1	↔	-722.0	-54.75	-722.0
2.6	Spin 2 System Testing	↔	753.5	45.03	79.1
2.3	Spin 2 Sys Engineering	↔	656.6	14.36	436.4
2.2	Spin 2 Logistics	↓	390.4	54.98	369.7

WBS #	Description	SV	SV$Cum	SV%Cum	VAC
2.10	Spin 2 Material	↑	3,938.8	80.03	326.5
2.8	Spin 2 Sys Infra Deployment	↓	-299.9	-28.99	204.3
2.4.1	Spin 2 Product Services	↓	-177.3	-7.09	-5.9
2.4.4	Spin 2 Client Enhancements	↓	-168.4	-19.60	511.8
2.4.2	Spin 2 PKI	↔	-165.7	-6.53	0.8

Trends & Projections



INDEPENDENT ANALYSIS

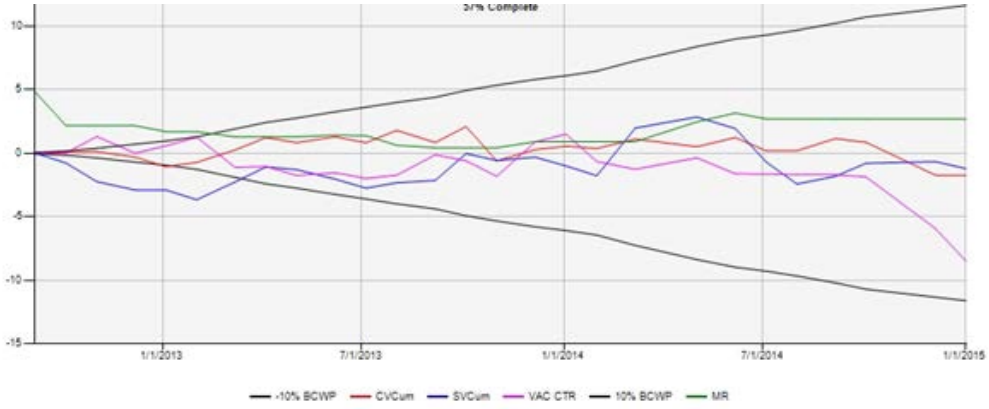
Third Integrated Baseline Review (IBR) for Spin 2 was held on 29 January.

Cost Variance (CV):
CV is due to increased complexity of resolving the DRs compared to the planned effort, some staff has moved over to Iteration 2.

Schedule Variance (SV):
SV is due to the receipt of material that was purchased and received earlier than planned.

Prepared by BA25/J.

DAMIR Summary of EVM Data



Select a chart

Show Data | Zoom

Work Performed (SM)	Work Scheduled (SM)	Performance Metrics (SM)	
Range of EACs $204 to $234	15% VAC $234	TCPI15% VAC 0.75	Cost Remaining $89
	EAC CTR $212	TCPI CTR 0.93	
	EAC PM $211	TCPI PM 0.94	
	EAC CPI $207	TCPIcpi 0.99	
	EAC TAB $206	TCPITAB 0.99	
	BAC $204	TCPIBAC 1.02	
Budget Remaining $86 42%	Work Remaining $87 43%	Schedule SPI cum 0.99 SPI 3mo 0.96 SV ($1)	Actuals $118
% Spent $118 58%	57% Complete $116 58% Scheduled	Cost CPI cum 0.99 CPI 3mo 0.78 CV ($2) MR $3	

- EAC is under budget (VAC ≥ 0.1)
- EAC within EV thresholds (-0.1 ≤ VAC < 0.1)
- EAC is 10% - 15% over budget (-0.15 ≤ VAC < -0.1)
- EAC is more than 15% over budget (VAC < -0.15)

FY10 NDAA Section 933

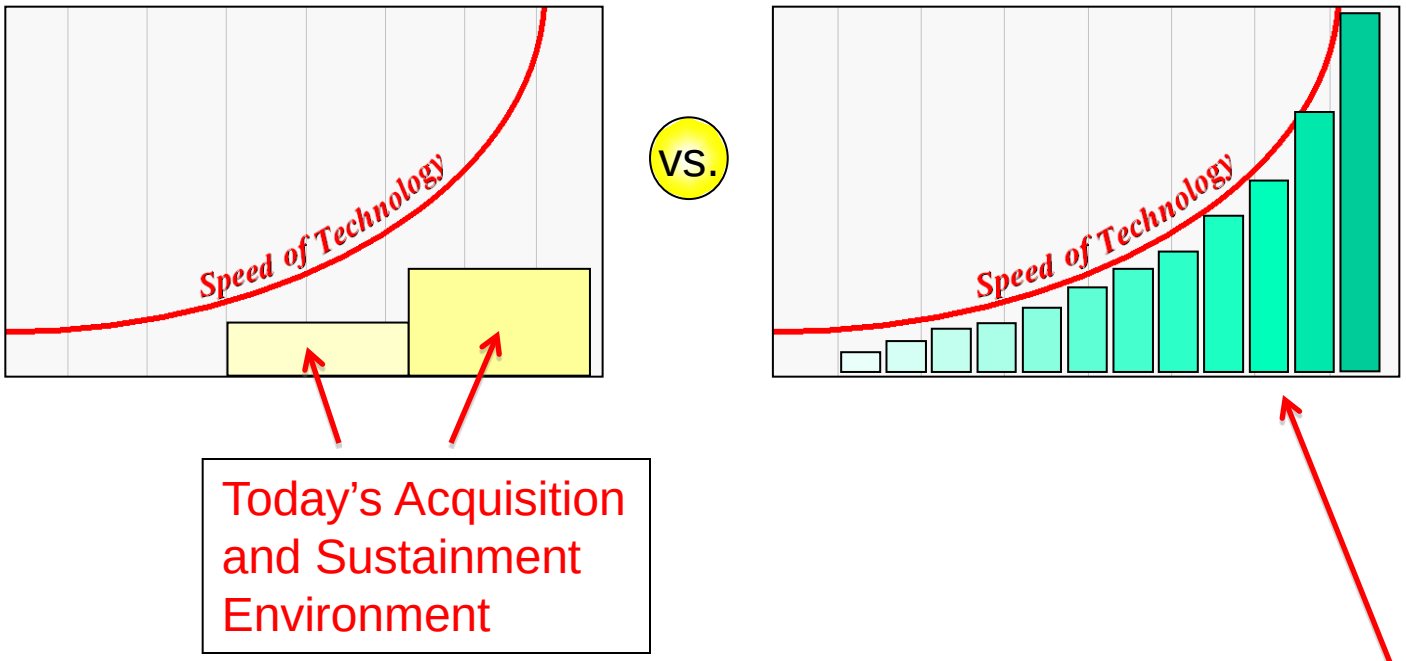
Develop a strategy for the rapid acquisition of tools, apps, and other capabilities for cyber warfare for USCYBERCOM and other cyber operations components of military

- Orderly process for determining, approving operational requirements
- Well-defined, repeatable, transparent, and disciplined process for developing capabilities IAW IT Acquisition process
- Allocation of facilities and other resources to thoroughly test capabilities in development, before deployment and use to validate performance and take into account collateral damage

Additional Elements of § 933

- Prevent abuse of quick reaction processes
- Establish reporting and oversight processes
- Maintain cyber T&E facilities, resources
- Orgs responsible for O&M of cyber infrastructure
- Involve independent T&E community
- Role of the private sector
- Roles of each Service/Agency
- Promote info sharing, cooperation, collaboration
- Interoperability, innovation, avoid duplication

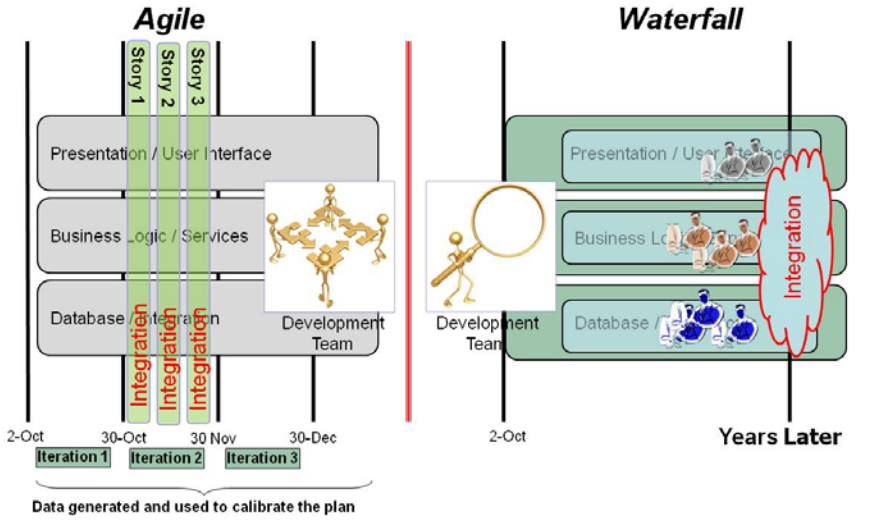
Persistent Cyber Threat Across IT Lifecycle and Agile's Opportunity

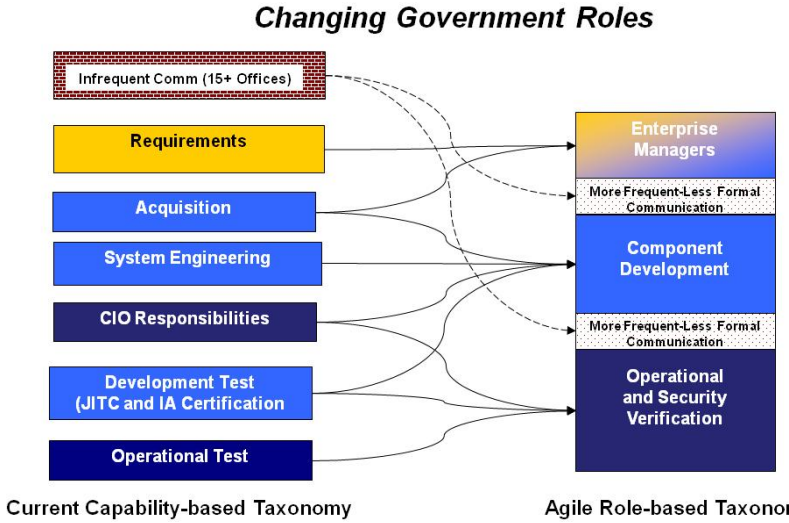


"The conventional DOD process for acquisition and sustainment does not address the Cyber threat that requires continuous changes and upgrades, requires 100% automated testing, requires a consistent cadence that begins in acquisition that continues in sustainment, and requires a defined role for the user (functional community) throughout

- an Agile-based acquisition system for information technology."

What Agile Does To Address Cyber

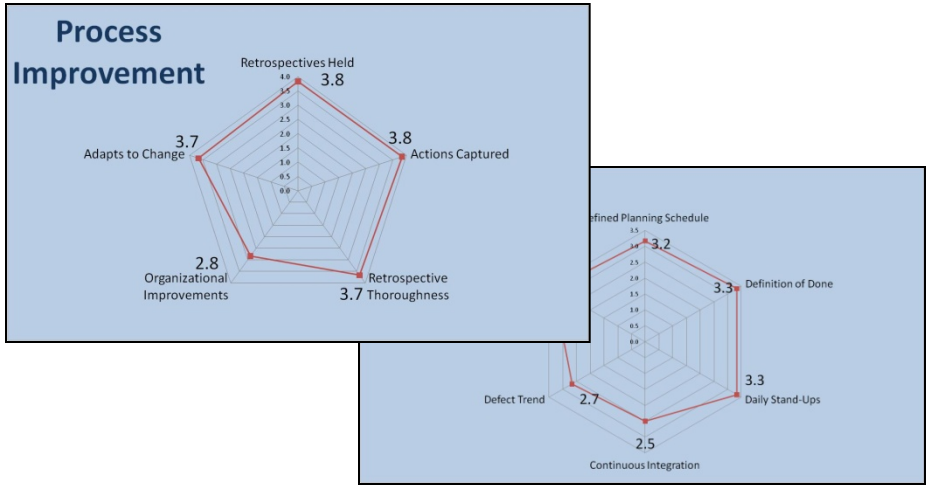




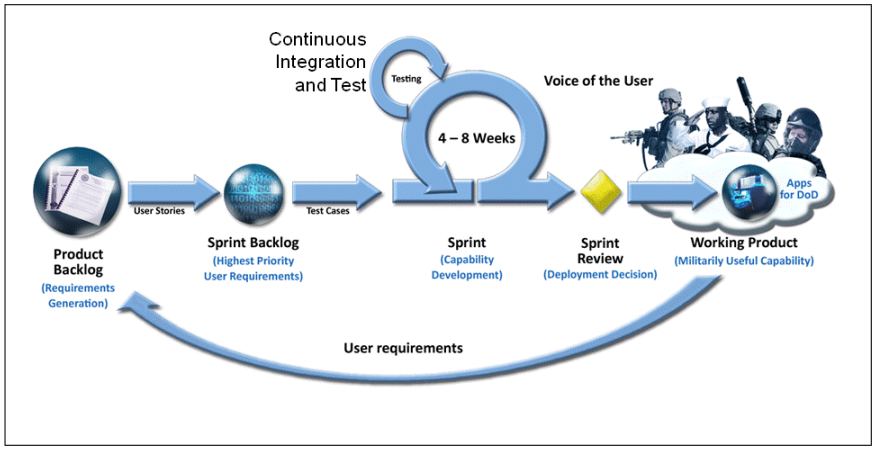
Significantly Changes Workforce Dynamics

Collapses Government Roles/Participants

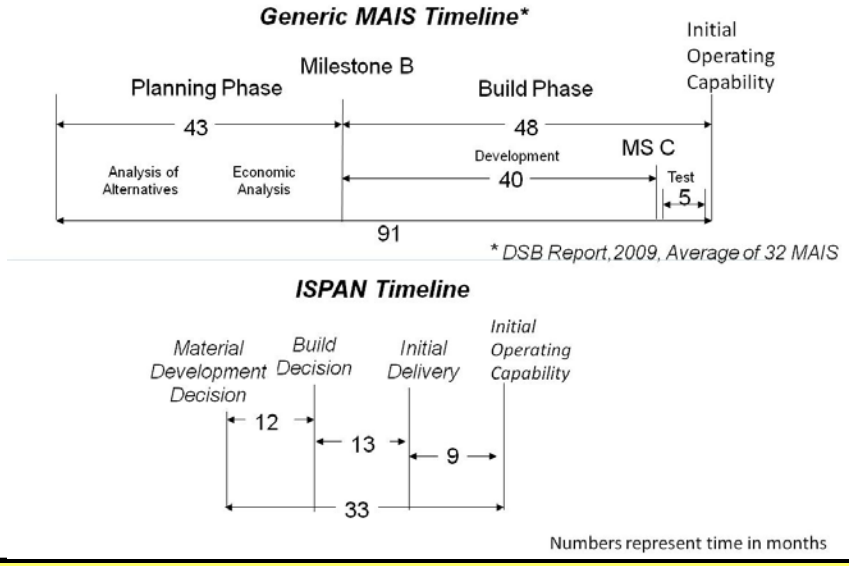
Changes Culture (& Improves Processes)



Speeds Delivery and Enhances Transparency



Feedback From ISPAN Section 804 Pilot



Reduced Acquisition Cycle Time by Two-Thirds

- Multiple stakeholders reluctant to support pilot
- Multiple milestone document staffing delays
- Value of new milestone documentation requirements
  - Full Deployment Decision (FDD) requires 11 milestone documents
- Traditional test processes delaying cycle time
  - 6+ month T&E period for a 10 month development
  - Multiple test reports for each fielding event

Identify Disincentives in Future Adoption

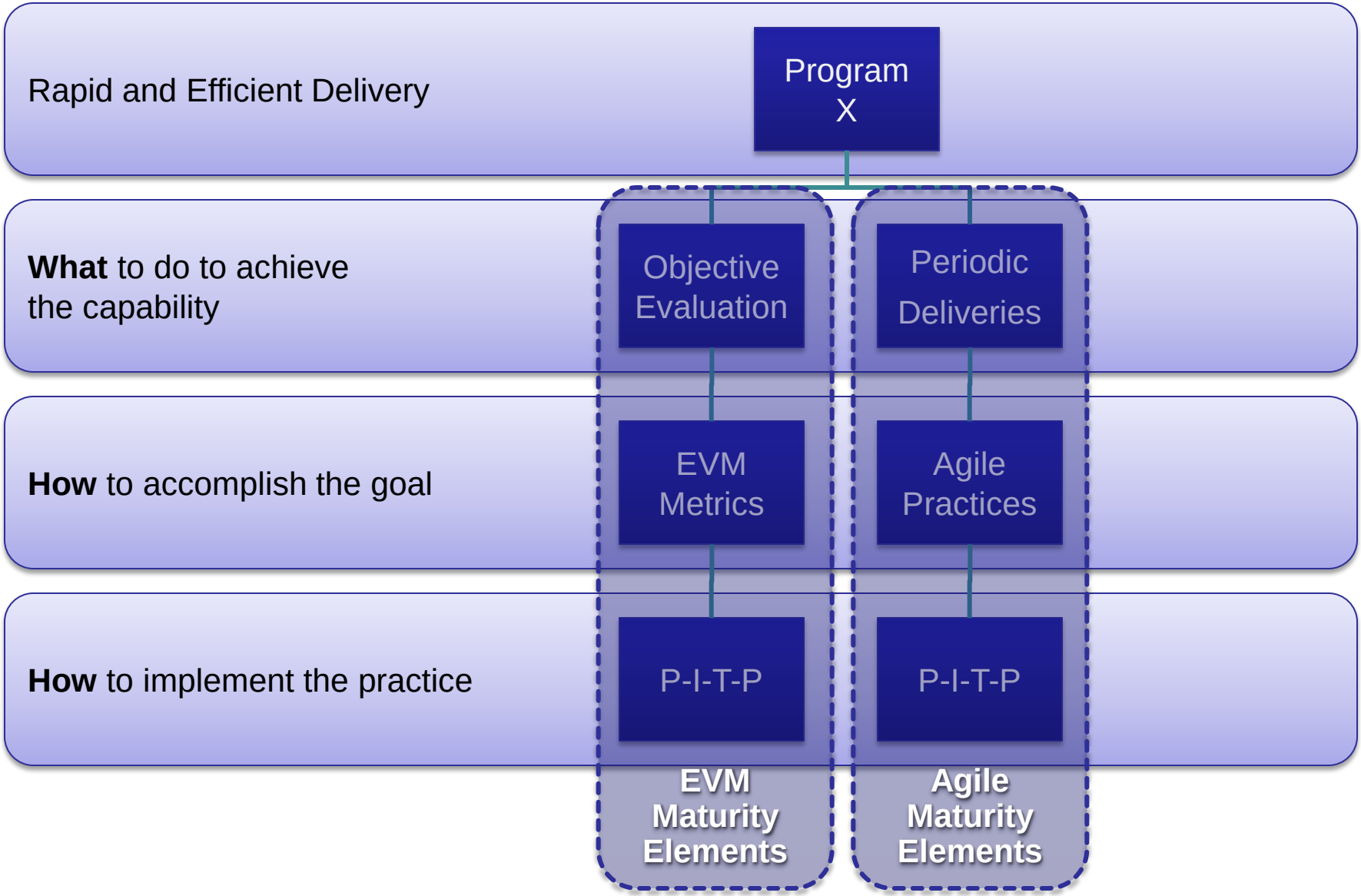
- Emphasis was on 2 sets of metrics collection: a. Program Content; b. Spend Analysis
- Functional Manager is essential … changed the dimension from constraining requirements growth to better understanding the needs of the user
- Requires a new mindset with PM & PEO
  - Acceptance of Functional Manager
  - Expectation Management Agreements
  - Capability Roadmaps

Raised Issues Hampering Wider Adoption

- Increased User (COCOM) decision-making role via quarterly program reviews & prioritizing spiral capability
- Changed the oversight and governance via replacing "trip wire" oversight to more frequent less formal involvement
  - Changed insight to contractor performance
- Contributed to changing AF staffing processes
- Brought forward test/evaluation & integration activities
- Increased transparency & accountability

Improved User Involvement & Processes

Institutionalizing Agile & EVM



The Future
Doing Nothing is Not an Option


MONDAY JULY 30 2001

Making an impact: Burti's Prost takes off after the Brazilian had rammed Michael Schumacher's Ferrari, right, at the start of the German Grand Prix

One Schumacher escapes, the other

- **Dynamic cyber threat – sophisticated, always present, and indiscriminate**
- **Innovation driven by commercial sector**
- **Information systems exist in a domain where change occurs rapidly**
- **Warfighter and business "Expectations" for the latest IT tools will not diminish**

EVM is needed to overcome key barriers to modernize DoD's IT acquisition environment and to institutionalize Agile delivery

Contact Information

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